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ABSTRACT

Intended for secondary teachers in rural areas, the paper examines ways to implement a learning center approach to meet a range of students' needs, including mainstreamed special needs, students, regular students, and gifted and talented students. The first section considers B. Bloom's Taxonomy as a basis for developing learning centers. Definitions of each level of the taxonomy are presented along with examples of questions and objectives which illustrate each level (knowledge, comprehension, application, analysis, synthesis, and evaluation). Then 83 ideas for products are offered. The second section discusses the nature of giftedness and talent and covers differentiation of instruction, student contracts, and responsibilities of the regular classroom teacher to the gifted child. The final section addresses concerns for using the approach with special needs students. Suggestions in this section include ways to adjust the work time for the mainstreamed student and the use of peers in the regular classroom. The student guide entitled "Blooming for Vertical and Horizontal Expansion or Creative Obfuscations to Confuse and Bewilder Your Friends" aims to assist the student in writing learning units for other students. It contains exercises and questions related to Bloom's Taxonomy. (CL)

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Developing Learning Centers Utilizing Bloom's Taxonomy for Secondary Students

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Introduction

This material is prepared for the secondary teacher that will dare to try something different in the secondary classroom. Secondary teachers in rural America are faced with more responsibility as a result of the national study, "A Nation at Risk." The pressure is on to up grade the skills in the basics, especially math and science. Yet a wider range of students appear in the classes. These changes perpetuate low moral in the teaching profession. What can be done to motivate the secondary student, update the content in the classroom, serve the wide range of student abilities and yet bring some joy into the classroom for both student and teachers? Will you dare to try a non-traditional approach, allowing students to develop centers based on different levels of ability and interest? Make learning happen in a positive atmosphere in your classroom!

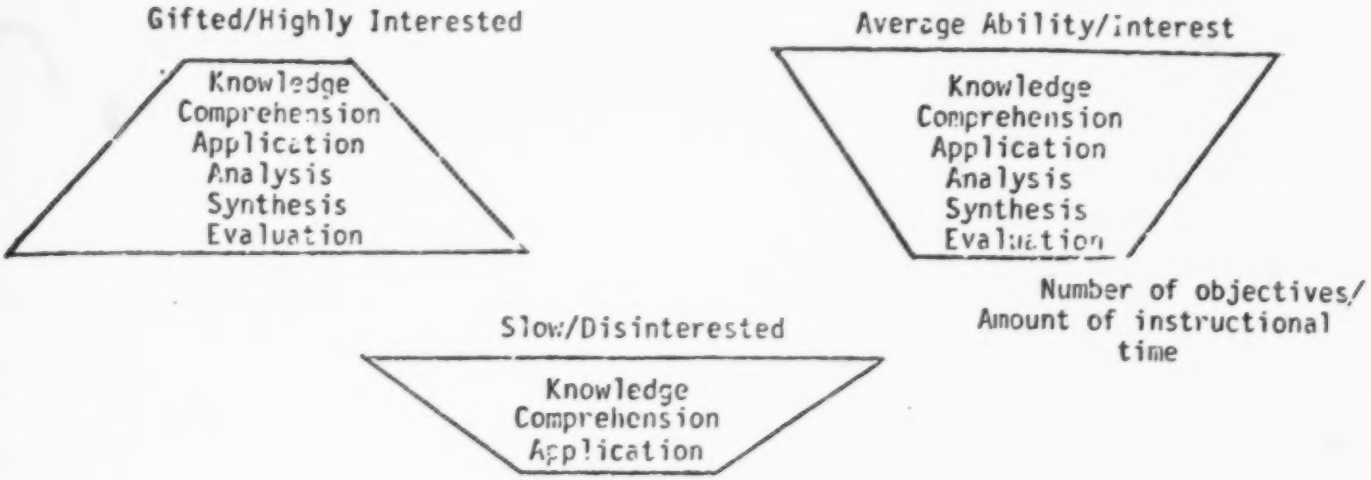
In order to meet the range of abilities (the mainstreamed special needs student, the so-called "regular student" plus the gifted and talented) an understanding of Bloom's Taxonomy is helpful. This is one approach that can be utilized for development of learning centers by students for students. It is assumed that all students can use some part of the taxonomy. Section one of this paper deals with Bloom's Taxonomy and development of learning centers. Section two deals with gifted and talented students. Section three deals with the mainstreaming of the special needs student.

Learning centers developed dealing with the content in any subject area will 1) keep information current on the subject; 2) reinforce basic skills in the subject matter area; 3) motivate the students; 4) allow for different levels of instruction in the classroom; 5) get the student involved and 6) even help alleviate teacher burnout!

Using Bloom's Taxonomy

Students with different levels of ability and interest will probably respond differentially when different levels of questions are presented. Gifted, bright and/or highly interested students, in a given content area, are more capable of processing and dealing with analysis, synthesis, and evaluation level questions than their less able or less interested counterparts.

Obviously all students should be expected to be able to answer basic objectives in any content area but the higher level students (in terms of ability and interest) should not be restricted to questions at this level. This is illustrated below:



It is generally assumed that the taxonomy is hierarchiacal, that is the student must be able to perform at the lower level prior to proceeding to higher levels. This is true for contents where the students do not possess any knowledge, but these contents are few and far between. In most cases you can assume that more able and more interested students will have more knowledge and experience with the content than other students and therefore you can expect these students to enter the content at initially higher levels.

On the following pages definitions of each level in the taxonomy are presented, along with examples of questions and objectives which are illustrative of each level. Following this are ideas for products which students could produce which, in many cases, go beyond paper and pencil tasks.

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KNOWLEDGE

Knowledge is defined as the remembering of previously learned material, the answering of questions solely by rote memory. This may involve the recall of a wide range of material, from specific facts to complete theories, but all that is required in the bringing to mind of the appropriate information. Knowledge represents the lowest level of learning outcomes in the cognitive domain.

Verbs	Example Questions/Objectives
Define	Define the term family
Draw	Draw on the chalkboard, the reproductive organs of a flower.
Repeat	What did the book say about_____.
Record	
Recall	Can you recall what the author said about?
Recite	Recite the Gettysburg Address.
Recognize	Which of these tools (hold up several) is a cresant wrench?
Write	
Memorize list	List the bones in the leg.
Name	What is the name of this object (hold up object)?
Relate	Who invented the _____.
Choose	Choose between these two blocks, the one which is larger.
Find	Find the location of Paris on the map at the front of the room.
Arrange(in learned order)	Can you arrange the parts of the skeleton in the correct order?
Label	Can you label the parts of the diagram?
Select	Select the verb in this sentence.
Match	
Omit	
Underline	Underline the noun in the sentence.
Quote	Can you quote what the book says on this matter?
Say	Can you say the Spanish word for work?
Touch	
Identify	Can you identify the verb in this sentence? (give sentence)
Hold	
Check	
Rehearse	
Affirm	
Associate	
Copy	
Group	
Indicate	
Point out	Point out the location of your nose.
Locate	Will you locate the 40th meridian on the globe at the front of the room?
Pickup	
Point	
Enumerate	
Reproduce	
Distinguish	Can you distinguish between___ and_____?
Acquire	

What is the capital of Kentucky?
Name the major Indian tribes in Oklahoma in 1840.
What two types of reasoning are used in the study of mathematics?
What is the algebraic symbolization of the pythagorean theorem?
How many states are there in the United States?
How does a plant get water?
What are the three important rules to follow in using the comma?
What is the proper form for writing a friendly letter?
Who is the author of Make Way for Ducklings?
How do you determine the miles per gallon a car is getting?
What name is commonly given to the idea expressed by a + b = b + a in mathematics?
List the main characters and their roles in The Hobbit?
What is a synapse?
What is free verse?
What is an isotope?
What state grows the most lettuce?
How do you spell Mississippi?
What steps does one follow in directing a bill through congress?
To what classification does the silk moth belong?
What are the three criteria by which we can assess the quality of a television program?
What are the basic steps in organizing a term paper?

COMPREHENSION

Comprehension is defined as the ability to grasp the meaning of material. This may be shown by translating material from one form to another (words to numbers), by interpreting material (explaining or summarizing), and by estimating further trends (predicting consequences or effects). This type of question requires students to restate a problem in their own words, to give an example of a principle or concept, to qualify statements, to extrapolate trends into the past or future, or to point out implications or consequences. These learning outcomes go one step beyond the simple remembering of material, and represent the lowest level of understanding.

Verbs	Example questions/objectives
Classify	Classify these plants into broad leaf or narrow leaf varieties.
Compare	Compare the books(listbooks) and tell why they are similar and different.
Contrast	Contrast the meter of the poems (supply poems).
Describe	Describe the reaction which you get when you mix vineagar and soda.
Discuss	Discuss the feelings that Huck Finn had when his father lock him in the room.
Interpret	Interpret the results of the experiment we just peformed.
Translate	Translate this definition(give definition) into your own words.
Change Reword	Reword this statement (supply statement) so that it is correct.
Revise Qualify	

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Expand	Expand on the rule (supply rule) by providing 3 examples.
Transform	Transform the sentence from active to passive voice.
Alter	State in your own words_____.
Vary	
Retell	Retell the story we just read in your own words.
Convert	Convert 16 feet 6 inches into meters.
Moderate	
Infer	What do you infer is going to happen next?
Explain	Explain why this result occurs.
Construe	What does the picture mean?
Outline	Outline what has happened in the story up to this point.
Spellout	Spellout the details of the process of . . .
Expound	Would you expound on _____?
Account for	How do you account for _____?
Project	What do you project will happen next?
Propose	What do you propose?
Advance	What ideas would you advance to_____?
Contemplate	
Submit	
Calculate	Calculate the answer based on the formula.
Read	
To give in own words	Give me definition of ____in your own words.
Represent	
Give an example of	Give an example of Kinetic energy.

What area of the U.S. has a climate like the West Indies?
Describe how Indians, in Oklahoma, lived prior to the Trail of Tears migration.
What is the algebraic statement which would indicate that a number is three times as large as a second number?
If X is an integral cube, what would be the next two integral cubes?
What are the advantages and disadvantages of using the following types of graphs: bar, pie, and line?
What is the English translation of that four-line poem?
Scandinavian immigrants to the U.S. tend to settle in the state of Minnesota. Where are their decendents most likely to be found?
Summarize, from your reading, what changes oil has brought to the middle East?
According to the maps, what is the largest city on the Virgin Islands?
How would you contrast the main characters in our two stories?
What additional information must we have to solve the problem?
In your own words, restate the author's explanation of multiplicative inverses.
Summarize the conflict between Bilbo Baggins and Gollum in The Hobbit?
What does he mean when he says "my kingdom for a horse?"
What does the chart tell us?
What are some of the differences between the American way of life and the Canadian way of life?
Today, we are reading about projections relating to various aspects of life in the future. What are some cautions we need to apply to our readings of these projections?

APPLICATION

Application refers to the ability to use learned material in new and concrete situations. This may include the application of such things as rules, methods, concepts, principles, laws, and theories. The knowledge must be successfully used under conditions that differ from those in which it was first learned or encountered.

VERBS	Example Questions/Objectives
Apply	Apply the formula to this problem and tell me the correct answer.
Calculate	Calculate the answer using the appropriate procedure.
Complete	Can you complete the statement?
Demonstrate	Demonstrate how you would skin a hog.
Illustrate	Illustrate the neural network which is presented on the slide.
Practice	
Solve	Solve the following problems.
Use	Use formal logic in developing your answer.
Employ	
Dramatize	Can you dramatize the interaction which took place between the two men?
Show	Show me how to set up the microscope.
Operate	Operate the band saw, using appropriate safety techniques.
Exhibit	
Adopt	
Try	
Manipulate	Manipulate the microscope controls to set the magnification at 100X.
Mobilize	
Devote	
Handle	
Wield	
Put to use	
Exploit	
Put in action	
Exert	
Consume	
Take up	
Capitalize	
Construct (follow diagram)	
Teach	Teach the concept of ____ to the class.
Paint	Paint a picture of the fruit in the bowl.
Sketch	Sketch a diagram of the muscles in the human hand.
Interview	Interview your team mate on the following topic (indicate topic).
Record	
Simulate	Simulate the behavior of a _____.
Classify	Classify these fossils into groups based on skeletal type.

How can you explain the fact that there is a desert region to the east of the Cascade Mountains?
How was the life of an Oklahoma Indian, circa 1840, similar to the way in which people live today?
If a man drives to town at the rate of X mph and returns along the same route at Y mph, what is his average rate?
Two of the four plates on Mrs. Jones' electric stove have burned out. How will this affect the time involved in preparing a four course dinner for her dinner guests tonight?
Where should punctuation marks be placed in the following sentences?
Relate Bilbo Baggins's ambivalent feelings toward his adventure of the ring to your own feelings about the first day of class in a new school.
If Tom Sawyer can paint a fence alone in three days, how long will it take him if he has three friends to it for him, assuming each friend can work at the same speed as Tom?
Mr. Jones wishes to purchase a new carpet for his living room. The room measures 18 feet by 20 feet. How much carpet will Mr. Jones need to purchase?

ANALYSIS

Analysis refers to the ability to break down material into its component parts so that its organizational structure may be understood. This may include the identification of the parts, analysis of the relationships between parts, and recognition of the organizational principles involved. Finding assumptions, distinguishing facts from opinion, discovery causal relationships, finding fallacies in stories or arguments, specifying the style of a written or unusual piece, or inferring the author's purpose are items that require analysis. Learning outcomes here represent a higher intellectual level than comprehension and application because they require an understanding of both the content and the structural form of the material.

VERBS	Example Questions/Objectives
Analyze	Analyze the solution in the test to be and determine its chemical composition.
Classify	Classify the samples of soil, using a ph test, into acid, alkaline and neutral soils.
Discuss	What was the author's purpose, bias, or prejudice?
Divide	
Explain	What must you know for that to be true?
Infer	Infer which of the components is malfunctioning given the following input (give input).
Inspect	Inspect the food processing facility and prescribe the vermin eradication measures necessary.
Separate	Separate the main from the subsidary characters in the book.
Sort	Sort these vegetables according to _____.
Differentiate	Which are facts and which are opinions?
Experiment	
Compare	Compare (list similarities and differences) the two characters in _____.

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Contrast	Contrast (list differences) the two methods.
Scrutinize	
Probe	
Investigate	Investigate the relationship between plant growth and fertilizer application.
Discover	Discover what is missing in this diagram.
Inquire	
Detect	Can you detect the power shift using a _____on this piece of equipment.
Examine	Examine this specimen and classify it based on its attributes.
Survey	
Dissect	Dissect the frog and illustrate what you find.
Simplify	Simplify this mathematical statement.
Search	
Survey	
Deduce	
Breakdown	Breakdown the solution into it component parts using a centrifuge.
Advertise	
Categorize	Categorize the stories into fiction, biography, etc.
Catalogue	
Correlate	
Diagnose	Diagnose the fault in _____.
Divide	Divide this expression into its component parts.
Isolate	Isolate the critical incident in the chapter which changed the way the character viewed the world.
Measure	Measure the impact of the statement on your classmates.

Are the author's conclusions substantiated by evidence?
How did Indian families, in Oklahoma, circa 1840, divide the daily work?
Which of the statements in the proof are not properly supported?
What is the theme that recurs throughout this musical arrangement?
Study the diagram and given information. What information is fact and what must be proved?
Which section of the orchestra essentially carried the theme in the last piece?
What have we assumed to be true if we accept these conclusions?
What generalization is the author making about the people of Western Europe?
Which of the statements in the report are irrelevant to the author's conclusions?
Which of the propoganda techniques given by the author apply to this advertisement?
How is the judge's sentence related to the defendent's wrong-doing?
From our discussion of human behavior, what are two basic assumptions we must accept regarding people?
Does the data support the hypothesis that women are not treated equally?
What do you think was the artist's reason for painting this picture?
"Some people are more equal than others." Describe the process by which the individual who voiced this phase arrived at his conclusion.

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SYNTHESIS

8.

Synthesis refers to the ability to draw together ideas or materials from different sources and to put the parts together to form a new whole. This may involve the production of a unique communication (theme or speech) a plan of operations (research proposal) or set of abstract relations (scheme for classifying information). Learning outcomes in this area stress creative behaviors, with major emphasis on the formulation of new patterns or structures which are designed to be communicated to others.

VERBS	Example Questions/Objectives
Arrange (new way)	Arrange the components into a new model.
Combine	Combine these two ideas into a metaphor.
Construct	Construct a model which illustrates the way in which the process works.
Create	Create a story which illustrates your viewpoint or the subject.
Design	Design the alternative method to _____.
Develop	Develop an alternative way to doing _____.
Generalize	Generalize this concept (provide concept) to other situations.
Organize	Organize these ideas into a meaningful structure.
Plan	Present a plan to do _____.
Predict	Predict the outcome(s) based on the information which has been developed in _____.
Prepare	Prepare a new approach to _____.
Compose	Compose a (music, art, etc.) piece.
Propose	Propose a new method by which _____.
Produce	Produce a product.
Invent	Invent something which will _____.
Formulate	Formulate a new procedure which will _____.
Assemble (new way)	Assemble the data, in a new way.
Build	Build a model which represents _____.
Set up	
Orginate	What would you do if _____?
Contrive	
Concoct	
Systemize	Systematize the information according to your own internal representatives of _____.
Blend	
Reorganize	Reorganize the information to support your viewpoint or arguement.
Make	Make a _____ to _____.
Generate	Generate a (poem, product, etc.) using the _____.
Evolve	
Constitute	
Breed	
Compile	Compile a review of the literature on _____.
Make up	
Form	
Imagine	If no one else knew, how could you find out?
Extrapolate	
Hypothize	

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What recommendations would you make to improve the air pollution problem in large cities?
What would an Indian family (Oklahoma, circa 1840) need to do to move?
How would you plan to teach a unit on geometric construction?
What would the world be like if we had no unique mathematical operations?
What would be the most important questions to ask in determining a solution to this problem?
How could the story have ended differently?
How many different uses of the coat hanger, other than hanging clothes, can you name?

Can you devise a set of rules for the first group of settlers on the moon?
Based on our study of the development of the African counties, what predictions can you make about the political future of Tanzania?
How might the days or seasons differ if the earth was in the shape of a pyramid with a square base? Assume that the earth revolves on its own axis and rotates around the sun.
How can you best communicate your feelings about freedom?
How can we get community support for a peer drug counseling program?
From our experiments with plants and different types of soil, what statement can we formulate regarding plant growth?
Drawing on your experiences in school, how do people view education in this country?

EVALUATION

Evaluation is concerned with the ability to judge the value, quality, or correctness of material (statement, novel, poem, research report) for a given purpose. The judgments are to be based on definite criteria. These may be internal (organization) or external criteria (relevant to the purpose) and the student may determine the criteria or be given them. Learning outcomes in this area are highest in the cognitive hierarchy because they contain elements of all of the other categories, plus conscious value judgements based on clearly defined criteria.

VERBS	Example Questions/Objectives
Appraise	Appraise the value of _____.
Assess	Assess the viability of _____.
Critique	Critique the article, based on the teacher developed checklist.
Estimate	Estimate the results taking the course of action.
Evaluate	Evaluate the merits of _____.
Grade	Grade the level of quality of _____.
Judge	Judge, based on interral criteria, the worth of _____.
Rank	Rank the merits of _____.
Rate	Rate the products based on _____.
Recommend	
Test	Test, using the experimental method, the hypothesis of _____.
Decide	Which of the books would you consider of greatest value?
Compare	
Revise	
Conclude	Conclude whether or not the hypothesis should be rejected.
Select	Select the best _____ based on internal/external

Criticize	
Measure	
Deduce	Which policy will result in the greatest good for the greatest number?
Prioritize	
Weight	
Accept	For what reason would you favor_____?
Reject	
Determine	Determine the merits of the arguements.
Referee	
Umpire	
Arbitrate	
Decree	
Rule on	
Award	
Censure	
Settle	
Edit	
Adjudge	
Debate	
Editorialize	

Based on the criteria of effectiveness and economy of time effort, and money, what would be the best solution to the middle east conflict?
What are the good and bad aspects of being a member of a normadic group?
Was Rene Descartes a better philosopher than a mathematician?
Is the construction of this geometric figure an accurate representation of the given information?
Which of the three pictures has the best color combination?
What conclusion can be justified in the selection read?
Is this the most appropriate art form to depict the subject?
What best justifies the action taken by the countries presently being studied?
Was this event accurately reported by the correspondent?
Indicate in what ways this is a beautiful poem?
According to the stated situation, which is the most appropriate move that man could take?
What do you think could happen if the Berlin Wall were torn down and the barriers were removed?

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Products

The following are illustrative of products which the students can be asked to develop. You should try always to have students develop some product as the result of doing a Bloom's objective.

1. a letter
2. a lesson
3. advertisement
4. annotated bibliography
5. art gallery
6. block picture story
7. collage
8. collection
9. collection w/illustration
10. chart
11. choral reading
12. comic strip
13. cooked concoction
14. crosscut diagram
15. crossword puzzle
16. debate
17. demonstration
18. detailed illustration
19. diorama
20. display
21. editorial
22. essay
23. experiment
24. fact file
25. fairy tale
26. family tree
27. filmstrip
28. flip book
29. game
30. glossary
31. graph
32. hidden picture
33. illustrated story
34. jigsaw puzzle
35. labeled diagram
36. large scale drawing
37. learning center
38. letter to the editor
39. map
40. map w/legend
41. mini-center
42. mobile
43. mural
44. museum exhibit
45. model
46. oral report
47. pamphlet
48. photo essay
49. pictures
50. pictures dictionary
51. picture story for children
52. poem
53. porta-center
54. poster
55. project cube
56. puppet
57. puppet show
58. rebus story
59. riddles
60. scavenger hunt
61. science fiction story
62. scrap
63. sculpture (clay, wire, junk)
64. seek and find
65. skit
66. small scale drawing
67. song
68. songs (collection)
69. stencil
70. story
71. street map
72. survey
73. tape
74. terrarium
75. text book
76. time line
77. transparency for an overhead projector
78. travelogue
79. TV news report
80. video tape
81. vocabulary list
82. worksheet
83. written report

Developing Learning Centers

1. Prepare directions for the students (insure that the students can function independently using the center).
   a. Make the directions clear and legible.
   b. Use terminology familiar to students.
   c. Use audio-visual aids to help students understand directions, if necessary.
   d. Include enough organizational information to enable students to work independently.
   e. Include examples of tasks to be accomplished, when appropriate.
   f. Include the objectives and/or purpose of the center.
   g. Include information about evaluation, the students should be able to correct their own answers for knowledge and comprehension levels.

2. Clearly state the objectives--help students be more purposeful, better organized, better able to determine when they have reached the objective. It is imparative that the students know what they are to do and under what conditions and standards, if conditions and standards are to be imposed.

3. Tell the students that they may choose among the objectives offered (in Bloom's units). This promotes individualization , interest, and motivation. They can do as many or as few as you will allow.

4. Centers (ala Bloom) are multi-level activities which provide information at a variety of levels which make them suitable for students at many levels of ability, interest, and age. It is well to remember that the purpose of individualization is to allow the student:
   a. choice of content based on interest.
   b. to control the rate of progress.
   c. to work at an appropriate level.

5. Provide as many manipulative/constructive activities as possible as well as paper and pencil activities. Knowledge and comprehension level items do not always have to be define and restate things.

6. Advantages of Bloom's taxonomy learning centers.
   a. All students can use the centers.
   b. Slower students will tend to choose knowledge and comprehension level objectives.
   c. Gifted students will tend to operate at the higher levels.
   d. All students can choose what they will do within the center (the level at which they will approach the material).
   e. All students will create some sort of product.
   f. Each student can proceed at his/her own best pace.
   g. Assuming that centers are curriculum related, all students will operate on the same content, although the levels will differ.

Writing Bloom's Centers

1. Centers without content (the student must create, use the library or other sources for content.
   a. Determine what the content is to be -- should be related to the scope and sequence of the area you teach (either vertical or horizontal expansion).
   b. Determine the kinds of behaviors which you wish the students to have as alternatives at each level. (See verb lists)
   c. Determine the kinds of products which the students should develop for each objective, products produced should be of a kind that are sharable with other students. (see product lists)
   d. Determine if center is to be part of a larger center or if it is to stand alone. If yes, then format according to the format of the larger center.
   e. Identify creative formats for packaging center.
      1. Determine size
      2. In a folder? More creative format, e.g., trash can, shoe, etc.
      3. A folder with pockets?
      4. Reference card?
      5. Self-checking card for knowledge and comprehension? Red acetate pocket?
      6. Bibliography? In a pocket?
      7. Task cards? On a ring? Cut in different shapes?
      8. Backboard?
      9. Are pictures available to illustrate folder or backboard?
      10. In a note book with other centers?
      11. Identifier tab, if designed for file drawer?
      12. Insure that formats are self checking and self evaluating where possible.
   f. Indicate whether or not a contract is necessary and the form that it should take, if it is required.

2. Centers developed around pictures, posters, maps, other graphics (with or without text).
   a. Items A-F from number 1.
   b. Examine graphic and isolate those things which would be focal stimuli for objectives.
   c. Read text (if any) for possible objective ideas.
   d. Determine if focal stimuli can be used for objectives at several levels.
   e. Write questions (objectives) about the entire graphic.
   f. Consider asking global questions about the graphic which are related but not necessarily drawn directly form it, e.g., a question about the time that a picture was painted or about the artist. Remember it is perfectly exceptable to have the student do research which goes beyond the visual.
   g. Determine the kinds of knowledge and comprehension questions which can be asked. Determine if you can make these self-checking.
   h. Look at creative ways of formulating the graphic
      1. Rolled and laminated
      2. On a fold up backboard
      3. On a window shade
      4. In a picture frame (multiple graphics in a poster display rack.)
      5. As a scroll
      6. On poster board
      7. On a slide (for a slide projector)

3. Centers developed around articles or other text content.
   a. Items A-F from number 1.
   b. If article has pictures A-H from number 2.
   c. Determine if the knowledge and comprehension items will be drawn from content beyond the text, e.g., define words using a dictionary.
   d. Determine format for knowledge and comprehension questions.
   e. Determine how many objectives at each level are appropriate for the amount of content.
   f. Look carefully at the relationship between text ar picture so that both can be tied to questions or objectives.
   g. Determine how the article(s) will be bound
      1. Rubber tape
      2. Stapled
      3. Spiral bound
      4. Glue and edge
      5. With or without cover page
   h. Determine how article will be packaged once bound
      1. In folder
      2. In spiral or 3-ring notebook
      3. In pocket or backboard
   i. Determine packaging if article is one of several for the center.
   j. Determine how task cards or objectives how ever formatted will be related to the article(s).

Gifted and talented children are

Those identified by professionally qualified persons who, by virtue or outstanding abilities, are capable of high performance. These are children who require differentiated educational programs and/or services beyond those normally provided by the regular school program to realize their contribution to self and society.

Children capable of high performance include those with demonstrated achievement and/or potential ability in any of the following areas, singly or in combination:

1. general intellectual ability
2. specific academic aptitude
3. creative or productive thinking
4. leadership ability
5. visual and performing arts

MAINSTREAMING

Definition: The process of providing the most appropriate education for each child in the least restrictive environment (The environment which is most facilitative in terms of learning goals.) Gearhart, 1980.

Students should be mainstreamed into a class when they are operating at a different cognitive or skill level if they are provided with differentiated educational experiences and they are NOT required to perform with the group, e.g., the student works on independent study, correspondence courses, learning centers, etc., as defined in the student's educational plan.

DIFFERENTIATING INSTRUCTION

Acceleration -- Going faster through the course content. Repetition is reduced; only must know and need to know information is presented. Content taught is based on student entry level from diagnostic testing. Usually used as a base for their forms of differentiation.

Vertical Expansion -- Affording opportunities to elaborate on the regular curriculum through additional allocation of working time, materials, experiences, etc. Involves the development of higher level thought processes (Bloom levels) or higher levels of skill related to regular curricular content.

Horizontal Expansion/Integration -- Providing opportunities to deal with a greater breadth of material related to the regular curriculum and/or the integration of two or more curricular areas to facilitate transfer and integration.

Parallel Track Curricula -- Exposure to a new curricular area not normally taught in school which has a coordinated scope and sequence of several years in length, e.g., philosophy, thinking skills, affective education, etc.

Interest Based Research or Independent Study -- Activities in which the student becomes an actual investigator of a real problem or topic using appropriate methods of inquiry.

Horizontal Enrichment -- Exposure to experiences, material or information which is unrelated to the regular curriculum and is not normally presented at a given grade level, to provide a broader data/experience base.

SHOULD DISTRUCTION FOR THE GIFTED HAVE A GOAL WHICH IS RELATED TO SOME SET OF SEQUENCED EXPERIENCES?

Possible Options

YES	CHOOSE	NO
Acceleration		1. Games to keep busy.
Vertical Expansion		2. Isolate projects to keep them busy.
Horizontal Expansion/ Integration		3. Isolate learning centers.
Parallel Track Curriculum		4. A constant diet of field trips.
		5. Work in the school office.
		6. Horizontal enrichment

Yes or No

Interest Based

Research

RESPONSIBILITIES OF THE REGULAR CLASSROOM TEACHER TO THE GIFTED CHILD

G/T Program--Mainstreaming

1. Provide differentiated education (vertical/horizontal expansion and/or acceleration) in all areas where the child is identified as gifted.

2. Do not expect the G/T child to participate in competitive group work in gifted areas (cooperative grouping is sometimes appropriate).

3. Expect the child to spend as much time/effort as the normal child on areas where he/she is NOT gifted.

4. Expect at least grade level performance in non-gifted areas.

G/T Program--Pull out (academic areas)

1. If the child is not pulled out totally in an academic area, provide differentiated education in that area where the child is present.

2. Expect the pullout teacher to provide grading in pullout academic areas.

3. Do not expect the child to do regular classwork in pullout areas.

4. Expect the pullout teacher to provide and you to use differentiated materials in the pullout areas.

G/T Program (Pullout--special program, e.g., olympics of the mind: Philosophy, etc.)

1. Repeat 1-4 from mainstreaming.

2. Do not expect the child to spend additional time in or out of class to make up differentiated instructional time missed going to pullout program.

NOTE: In all gifted areas, instruction should be individualized. Differentiated and probably accelerated if it is to be considered appropriate according to state law and gifted educational theory.

Contracts

The contract learning system is a favorite of students and teachers because:

1. It provides a student/teacher centered as opposed to teacher/centered method of learning.
2. The student and teacher know before hand what is to be learned and completed.
3. The student and teacher plan together (negotiate as equals).
4. The teacher is free to help more students.
5. The student has more freedom to be creative through self-directed learning.
6. Record keeping is easily facilitated.

Directions to Students who are Creating a Contract

1. Explain what it is that you like to learn. (You may choose from a list given in class and/or you may suggest something else). Be sure to include some ideas of how much of it you wish to learn.
2. Try to explain what you expect to gain by learning this. What's the personal benefit to spending your time on this subject?
3. List below as many strategies (ways, methods, activities) which you might employ in order to learn what you have chose. Put a star (*) next to the ways which seem best or most pleasant to you.
4. Is there some kind of product which you can produce which might be a good way of ending your study (a paper, play, painting, poem, lesson you would teach, etc.) Could you share your learning in some way with others in the class?
5. In our school we have to give each student a grade at the end of each "Marking Period." In order to make this more fair, you can help by suggesting below some criteria (Standards) by which the teacher will be able to rate your learning. The teacher will help with this. Indicate what specific things the teacher should look for, also indicate what combination of things will earn an "A" or "B", etc.
6. Some people work best when they have a deadline, and others work best without one. Which pleases you most? If you wish a deadline, set one here. What penalties (if any) should there be if you do not meet your deadline?

Contracts might include:

Student's name
Date
Contract title
Time line
Evaluation terms
Day and time for conferences
Teacher's name
Grade level
Objectives
Methods of completing tasks
Date for completing contract
Student and teacher signature

Section Three

DEVELOPMENTAL....REMEDIAL ....COMPENSATORY....OR ADAPTIVE

In working with students with special needs, teachers are faced with several academic decisions in planning for the individual differences of each one:

1. Adaptive instruction refers to changes made by the teacher in materials, environment, etc. which enable a student to function more effectively in the classroom. It is generally not the intention of an adaptation to remediate or change a difficulty, but to provide the student with a means of coping with the problem in a given individual situation. The greatest percentage of changes made in classrooms are adaptations of instruction to meet individual needs as they arise.

2. Compensatory instruction refers to teaching the student ways of getting around a specific problem. The focus on compensatory instruction is to give the student a technique which can then be applied in other situations where the problem is likely to occur. For instance, if a student has difficulty remembering instruction, the compensation might be to teach the student to outline or to jot down key words to aide memory.

3. Remedial instruction refers to the re-teaching of specific concepts an/or skills which are required of the student for effective classroom performance. For instance, if a student can add, has subtraction skills but is confused about regrouping, can multiply hesitantly, and has some beginning division skills, then the program is a remedial one in that the teacher will focus on those skills which the student lacks, while working to strengthen those skills which the student has.

4. Developmental instruction is required for some students, especially those who either follow a more or less normal curriculum sequence or need and alternative curriculum from the average of their peers. The major focus here is on progress of materials and techniques at the students' levels and systematic, sequential instruction of the selected curriculum.

Section Three
Suggested Teaching Strategies for Dealing with the Mainstreaming Student

1. Adjust work time for the mainstreamed student by:
   a. giving the student longer time to complete assignments.
   b. letting the student work at reading and writing assignments for short periods of time, perhaps just ten or fifteen minutes depending on his ability to concentrate, followed by other types of activities for short periods of time.
   c. setting up a specific schedule for the student so that they know what to expect; being physically close to them if you have to change or vary their routine.
   d. keeping work periods short; gradually lengthening them as the student begins to cope.
   e. alternating quiet and active time; having short periods of each; making movement as purposeful as possible.

2. Use of peers in the regular classroom:
   a. having students drill aloud to themselves or to another student.
   b. dictating information into a recorder or another student.
   c. having another student read important information to mainstreamed student.
   d. having students read important information aloud to themselves or to another student.
   e. having students re-auditorize silently, vocalizing material inside their heads and later discuss with a peer.

3. The resource room teacher and the regular classroom teacher communicate informally a minimum of once every two weeks to discuss progress and share experiences of the mainstreamed student.

4. Schedule students into classes, where possible, that are taught by teachers who are willing to midify their requirements to meet the needs of handicapped students.

5. Demonstrate techniques that may be used for the entire class but which will specifically aid the LD student.

6. Provide tape recordings of textbooks or chapter summaries (possible an in-class small group activity, or can be done by accelerated learner or tutor).

7. Communicate with parents concerning child's strengths and weaknesses, progress or lack of progress, conflicts or problems at school. (Keep sample of students work)

8. Demonstrate new types of materials and testing equipment that would benefit the regular classroom teacher.

9. Arrange for mainstreamed students to pre-enroll in classes where they will have the best chance to succeed before regular enrollment closes those classes.

10. Establish planning sessions between student, counselor, and resource room teacher to select most likely schedule arrangements.

11. Share materials and audio-visual equipment.

12. To utilize audio-visual aides as alternative approaches to vocabulary development, etc.

13. Communicate at least one good thing about the student to the parent during the school term. This may be a conference, note, or phone call.

14. Utilize role playing as a means of affective development for all students (especially LD) in the regular classroom.

15. Provide a modified prescription for use by the regular classroom teacher in the content area. (The resource room teacher could be responsible for this.)

16. Monitor student adjustment to mainstreamed class.

17. Make arrangements for LD students to take their test from the regular classroom to the resource room where they can take it without distraction.

18. Make arrangements for resource room teachers to read tests to students who are unable to read or comprehend written questions effectively.

19. Allow students to answer test questions via alternative methods (tape recording, visual display, etc.) provided their learning disability hinders them from taking the test in the normal fashion.

20. Make special arrangements in regular class to minimize effects of distractibility, short attention span, or inability to follow verbal instructions.

Blooming for Vertical and Horizontal Expansion or Creative Obfuscations to Confuse and Bewilder your Friends

A Student Guide to Bloom's Taxonomy

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Presented at the American
Council of Rural Special
Education Conference,
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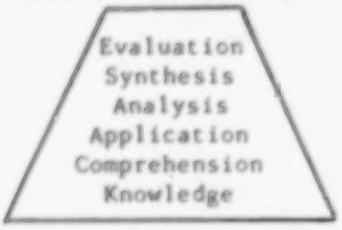
Introduction

The purpose of this booklet is to assist you in writing learning units for other students in areas where you are interested. You have been selected to help create materials because (you may pick only one) 1) you are smart; 2) you are a smart mouth; 3) you are as smart a . . .; 4) you are free this hour; 5) you are inexpensive this hour. Seriously, this booklet is designed to help you help yourself and others to examine and work with materials at a level that is higher than rote regurgitation (otherwise known as the puke-back method).

So what is this method and is it any fun? Fun, well that depends on how perverted you are! The method: Bloom's Taxonomy



The idea behind Bloom's Taxonomy is that there are very limited number of ways in which you can deal with or process information. These are represented in the pyramid as six levels; levels of complexity of process that is.

Let's define these six levels so that we can better see what we are talking about. Knowledge is defined as the remembering of previously learned material, the answering of questions solely by rote memory. This may involve the recall of a wide range of material, from specific facts to complete theories, but all that is required is the bringing to mind of the appropriate information. Knowledge represents the lowest level of learning outcome in the cognitive domain.

The student who is performing at the knowledge level does the following kinds of things: (1) Responds to classroom situation (stays awake, looks at teacher with glazed eyes); (2) Absorbs information -- looks, listens, reads; (3) Remembers (only those things taught in class, other rememberings called daydreaming); (4) Practices procedures -- drills, recites (regurgitates); (5) Covers information in books (preferably with a water proof cover before regurgitation); (6) Recognizes information that has been covered (no matter what it is covered with.).

The second level in the Taxonomy is Comprehension: defined as the ability to grasp the meaning of material. This may be shown by translating material from one form to another (words to numbers), by interpreting material (explaining or summarizing), and by estimating further trends (predicting consequences or effects). This type of question requires the respondents to restate a problem in their own words, to give an example of a principle or concept, to qualify statements, to extrapolate trends into the past or future, or to point out implications or consequences. These learning outcomes go one step beyond the simple remembering of material, and represent the lowest level of understanding.

The student who is performing at the comprehension level can do some or all of the following: (1) Explain information rather than merely quote it (this is the level the principal is at when he shreaks, " Do you understand what I mean?"); (2) Makes simple demonstrations (rioting and cross burning are excluded); (3) Translates information into his/her own words (when caught this is known as plagerism); (4) Extends information to new situations; (5) Interprets information from technical to familiar terms (a pedagogue is a _____).

In the following section 5 objectives are presented. To test your Knowledge and Comprehension please indicate whether the objective is at the (K) Knowledge or (C) Comprehension level or if it is at (N) Neither level. Place a check mark in the space below the correct letter. Answers are at the bottom of the page.

	K	C	N
1. Define the term pedant.	____	____	____
2. Compare the pedant to the pedagogue.	____	____	____
3. Recite the Gettysburg Address.	____	____	____
4. Give an example of pedantry.	____	____	____
5. Manipulate the controls, of the microscope, to set the magnification at 100X	____	____	____

The third level in the Taxonomy Application, refers to the ability to use learned material in new and concrete situations. This may include the application of such things as rules, methods, concepts, principles, laws, and theories. The knowledge must be successfully used under conditions that differ from those in which it was first learned or encountered.

The student who is performing at the application level does some or all of the following: (1) Solves novel problems (given a tube of super glue, how can you keep the teacher from giving the test she has in her desk drawer; (2) Constructs projects, models, apparatus, etc. (Dr. Frankenstein I presume); (3) Demonstrates use of knowledge (Disrobe a . . . [it better be a manikin or you are in real trouble]).

The fourth level of the Taxonomy is Analysis which refers to the ability to break down material into its component parts so that its organizational structure may be understood. This may include the identification of the parts, analysis of the relationships between parts, and recognition of the organizational principles involved. Finding assumptions, distinguishing facts from opinion, discovery causal relationships, finding fallacies in stories or arguments, specifying the style of a written or unusual piece, or inferring the author's purpose are items that require analysis. Learning outcomes here represent a higher intellectual level than comprehension and application because they require an understanding of both the content and the structural form of the material.

ANSWERS: 1-K, 2-C, 3-K, 4-C, 5-N

The student who is performing at the analysis level does all or some of the following: (1) Discusses information in depth (will the Alvin discussion group please meet at the forward hatch); (2) Uncovers interrelationships among ideas (now remember we said ideas, not people); (3) Discovers deeper meanings and insituations not apparent at first (tag line on a letter of recommendation, "all of the above apply except where Mr. Jones has been drinking.") (4) Sees similarities and differences between styles (Michael Jackson and Lawrence Welk you say . . .).

Here is another practice exercise. See how many objectives you can categorizes as (K) Knowledge, (C) Comprehension, (A) Application, (AN) Analysis or (N) None of these. Check one:

	K	C	A	AN	N
1. Combine two ideas into a new metaphor.	___	___	___	___	___
2. Disect the frog and illustrate what you find.	___	___	___	___	___
3. Classify soil samples based on ph values.	___	___	___	___	___
4. Convert inches and feet into meters, when given example problems	___	___	___	___	___
5. Paint a picture of the fruit in the bowl.	___	___	___	___	___
6. Discuss the feelings that Huck Finn had when his father locked him in the room.	___	___	___	___	___
7. Find the location of Slick, OK using a map.	___	___	___	___	___
8. Find the location of the capital of the U.S.A., Washington, D.C., using a U.S. Map.	___	___	___	___	___

The fifth level of the Taxonomy is Synthesis which refers to the ability to draw together ideas or materials from different sources and to put the parts together to form a new whole. This may involve the production of a unique communication (theme or speech) a plan of operations (research proposal) or set of abstract relations (scheme for classifying information). Learning outcomes in this area stress creative behaviors, with major emphasis on the formulation of new patterns or structures which are designed to be communicated to others.

Things that a student is likely to do at the Synthesis level include (1) Produces unique communications (Gubblz ergerg zug); (2) Formulates new hypotheses based on analyzed information (If I put one drop of super glue on the front lip of each desk drawer . . .); (3) Makes discoveries and generalizations (It takes two hands to handle a whopper . . .); (4) Proposes new ways of doing things (You are going to put your what in his where?).

ANSWERS: 1-N, 2-AN, 3-AN, 4-A, 5-A, 6-C, 7-A, 8-K.

The highest level of the Taxonomy, Evaluation, is concerned with the ability to judge the value, quality, or correctness of material (statement, novel poem, research report) for a given purpose. The judgements are to based on definite criteria. These may be internal (organization) or external criteria (relevant to the purpose) and the student may determine the criteria or be given them. Learning outcomes in this area are highest in the cognitive hierarchy because they contain elements of all of the other categories, plus conscious value judgements based on clearly defined criteria.

Here is another set of objectives to categorize.

	K	C	A	S	E	N
1. Determine whether Rene Descarte was a better philosopher than he was a mathematician.	___	___	___	___	___	___
2. Describe your feelings about freedom.	___	___	___	___	___	___
3. Given a list of sentences, select the verb in each sentence.	___	___	___	___	___	___
4. Write the Spanish word for work.	___	___	___	___	___	___
5. State the definition of entropy in your own words.	___	___	___	___	___	___
6. Teach the concept of Zebec to the class.	___	___	___	___	___	___
7. Inspect the school cafeteria and prescribe the vermin eradication measures that are necessary.	___	___	___	___	___	___
8. Given a list of stories, categorize them as fiction, biography, etc.	___	___	___	___	___	___
9. Build a model which represents love.	___	___	___	___	___	___

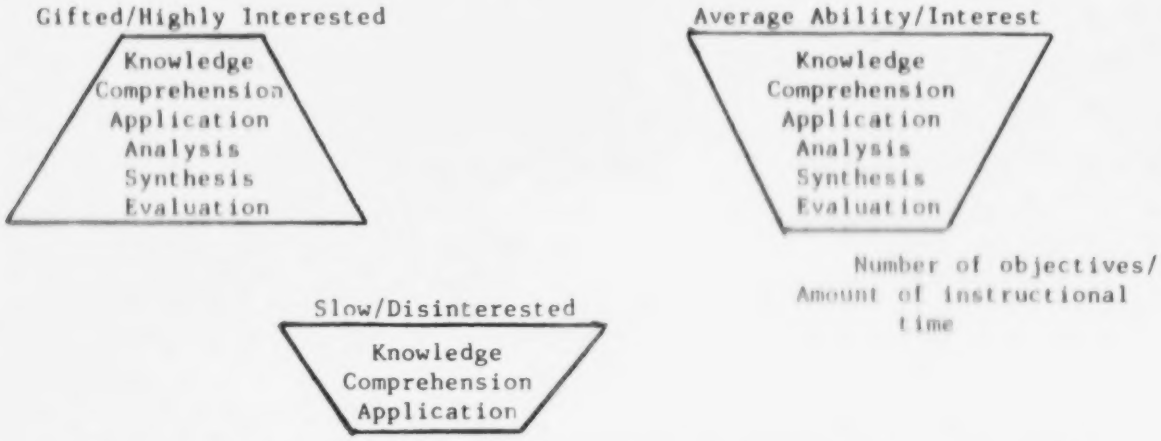
Remember, back at the beginning of this booklet we said that you would learn to have fun and to share the things you were interested in with others. OK, now that you know Bloom's Taxonomy here is a way that you can go about it.

Using Bloom's Taxonomy

Students with different levels of ability and interest will probably respond differentially when different levels of questions are presented. Gifted, bright and/or highly interested students, in a given content area, are more capable of processing and dealing with analysis, synthesis, and evaluation level questions than their less able or less interested counterparts.

ANSWERS: 1-E, 2-S, 3-K, 4-K, 5-A, 6-A, 7-AN, 8-AN, 9-S.

Obviously all students should be expected to be able to answer basic objectives in any content area but the higher level students (in terms of ability and interest) should not be restricted to questions at this level. This is illustrated below:



It is generally assumed that the taxonomy is hierarchical, that is the student must be able to perform at the lower level prior to proceeding to higher levels. This is true for contents where the students do not possess any knowledge, but these contents are few and far between. In most cases you can assume that more able and more interested students will have more knowledge and experience with the content than other students and therefore you can expect these students to enter the content at initially higher levels.

To share your interests with others, you can create Bloom's units. In Appendix 1 of this booklet, you will find a list of different objectives at each level in the Taxonomy. In some cases the objectives are stated in question form, either approach being acceptable. Appendix 1 also provides a verb list which should facilitate writing objectives. Appendix 2 provides a list of products which can be used in the creating of Bloom's units. Students should always be asked to develop a product as a result of interacting with the material, however, as you will readily recognize, writing a paper is only one option.

Appendix three contains four example learning units which have been developed based on Bloom's Taxonomy. Units 1 & 2 are centers without content. This kind of center basically presents a series of questions or objectives based on the Taxonomy. The student is free to choose within the objective set which one or ones he/she will work with. Units 3 & 4 are centers developed around an article or book or series thereof. Unit 4, The Swamp Rabbit, has the article included as an example.

Developing Learning Centers

Remember not all students read or process information as well as you do. Toward this end the following are provided as suggestions for learning center development.

Prepare directions for the students (insure that the students can function independently using the center).

a. Make the directions clear and legible.
b. Use terminology familiar to students.
c. Use audio-visual aids to help students understand directions, if necessary.
d. Include enough organizational information to enable students to work independently.
e. Include examples of tasks to be accomplished, when appropriate.
f. Include the objectives and/or purpose of the center.
    1. Clearly state the objectives--help student be more purposeful, better organized, better able to determine when they have reached the objective. It is inperative that the students know what they are to do and under what conditions and standards, if conditions and standards are to be imposed.
    2. Tell the students that they may choose among the objectives offered this promotes individualization, interest, and motivation. They can do as many or as few as you will allow.
g. Include information about evaluation, the students should be able to correct their own answers for knowledge and comprehension levels.

Writing Bloom's Centers

The following give some brief ideas for formating/packaging in Bloom's units you have created. You should remember that the more interesting and exciting the unit looks the more likely you are to entice others to explore what you have written.

1. Centers without content
    a. Determine what the content is to be -- should be related to a content taught in your school.
    b. Determine the kinds of behaviors which you wish the students to have as alternatives at each level. (See verb list)
    c. Determine the kinds of products which the students should develop for each objective, products produced should be of a kind that are sharable with other students. (See product list)
    d. Determine if center is to be part of a larger center or if it is to stand alone. If yes, then format according to the format of the larger center.
    e. Identify creative formats for packaging center.
        1. Determine size
        2. In a folder? More creative format, e.g., in a small trash can, or shoe, etc.
        3. A folder with pockets?
        4. Reference card?
        5. Self-checking card for knowledge and comprehension? Red acetate pocket?

6. Bibliography? In a pocket?
7. Task cards? On a ring? Cut in different shapes?
8. Backboard?
9. Are pictures available to illustrate folder or backboard?
10. In a note book with other centers?
11. Identifier tab, if designed for file drawer?
12. Insure that formats are self checking and self evaluating where possible.

f. Indicate whether or not a contract is necessary and the form that it should take, if it is required.

2. Centers developed around articles or other text content.
   a. Items A-F from number 1.
   b. Determine if the knowledge and comprehension items will be drawn from content beyond the text, e.g., define words using a dictionary.
   c. Determine format for knowledge and comprehension questions.
   d. Determine how many objectives at each level are appropriate for the amount of content.
   e. Look carefully at the relationship between text and picture so that both can be tied to questions or objectives.
   f. Determine how the article(s) will be bound
      1. Rubber tape
      2. Stapled
      3. Spiral bound
      4. Glue and edge
      5. With or without cover page
   g. Determine how article will be packaged once bound
      1. In folder
      2. In spiral or 3-ring notebook
      3. In pocket or backboard
   h. Determine packaging if article is one of several for the center.
   i. Determine how task cards or objectives how ever formatted will be related to the article(s).
   j. If the article has pictures, posters, maps, other graphics which you wish to emphasize:
      1. Examine graphic and isolate those things which would be focal stimuli for objectives.
      2. Read text (if any) for possible objective ideas.
      3. Determine if focal stimuli can be used for objectives at several levels.
      4. Write questions (objectives) about the entire graphic.
      5. Consider asking global questions about the graphic which are related but not necessarily drawn directly from it, e.g., a question about the perfectly exceptable to have the student do research which goes beyond the visual.
      6. Determine the kinds of knowledge and comprehension questions which can be asked. Determine if you can make these self-checking.

7. Look at creative ways of formulating the graphic
   a. Rolled and laminated
   b. On a fold up backboard
   c. On a window shade
   d. in a picture frame (multiple graphics in a poster display rack.)
   e. As a scroll
   f. On poster board
   g. On a slide (for a slide projector)

3. Decorating the Center.
   a. Magazine pictures on front and back or inside
   b. Drawings on front and back or inside
   c. Cut up wrapping paper
   d. Curiosity provoking statements
   e. Color contrasts
   f. Real photos
   g. Back-board
   h. Tasks (objectives) on cards cut to illustrate the center, e.g., dinosaur shaped for dinosaur center.

Appendix 1
Knowledge

Verbs	Example Questions/Objectives
Define	Define the term family
Draw	Draw on the chalkboard, the reproductive organs of a flower.
Repeat	What did the book say about _____.
Record	
Recall	Can you recall what the author said about?
Recite	Recite the Gettysburg Address.
Recognize	Which of these tools (hold up several) is a cresant wrench?
Write	
Memorize list	List the bones in the leg.
Name	What is the name of this object (hold up object)?
Relate	Who invented the _____.
Choose	Choose between these two blocks, the one which is larger.
Find	Find the location of Paris on the map at the front of the room.
Arrange(in learned order)	Can you arrange the parts of the skeleton in the correct order?
Label	Can you label the parts of the diagram?
Select	Select the verb in this sentence.
Match	
Omit	
Underline	Underline the noun in the sentence.
Quote	Can you quote what the book says on this matter?
Say	Can you say the Spanish word for work?
Touch	
Identify	Can you identify the verb in this sentence? (give sentence)
Hold	
Check	
Rehearse	
Affirm	
Associate	
Copy	
Group	
Indicate	
Point out	Point out the location of your nose.
Locate	Will you locate the 40th meridian on the globe at the front of the room?
Pickup	
Point	
Enumerate	
Reproduce	
Distinguish	Can you distinguish between _____and_____?
Acquire	

Example Questions/Objectives

What is the capital of Kentucky?
Name the major Indian tribes in Oklahoma in 1840.
What two types of reasoning are used in the study of mathematics?
What is the algebraic symbolization of the pythagorean theorem?
How many states are there in the United States?
How does a plant get water?
What are the three important rules to follow in using the comma?
What is the proper form for writing a friendly letter?
Who is the author of Make Way for Ducklings?
How do you determine the miles per gallon a car is getting?
What name is commonly given to the idea expressed by a + b = b + a in mathematics?
List the main characters and their roles in The Hobbit?
What is a synapse?
What is free verse?
What is an isotope?
What state grows the most lettuce?
How do you spell Mississippi?
What steps does one follow in directing a bill through congress?
To what classification does the silk moth belong?
What are the three criteria by which we can assess the quality of a television program?
What are the basic steps in organizing a term paper?

Comprehension

Verbs	Example Questions/Objectives
Classify	Classify these plants into broad leaf or narrow leaf varieties.
Compare	Compare the books (listbooks) and tell why they are similar and different.
Contrast	Contrast the meter of the poems (supply poems).
Describe	Describe the reaction which you get when you mix vineagar and soda.
Discuss	Discuss the feelings that Huck Finn had when his father locked him in the room.
Interpret	Interpret the results of the experiment we just performed.
Translate	Translate this definition (give definition) into your own words.
Change Reword	Reword this statement (supply statement) so that it is correct.
Revise Qualify	

Application

Verbs	Example Questions/Objectives
Apply	Apply the formula to this problem and tell me the correct answer.
Calculate	Calculate the answer using the appropriate procedure.
Complete	Can you complete the statement?
Demonstrate	Demonstrate how you would skin a hog.
Illustrate	Illustrate the neural network which is presented on the slide.
Practice	
Solve	Solve the following problems.
Use	Use formal logic in developing your answer.
Employ	
Dramatize	Can you dramatize the interaction which took place between the two men?
Show	Show me how to set the microscope.
Operate	Operate the band saw, using appropriate safety techniques.
Exhibit	
Adopt	
Try	
Manipulate	Manipulate the microscope controls to set the magnification at 100X.
Mobilize	
Devote	
Handle	
Wield	
Put to use	
Exploit	
Put in action	
Exert	
Consume	
Take up	
Capitalize	
Construct (follow diagram)	
Teach	Teach the concept of _____ to the class.
Paint	Paint a picture of the fruit in the bowl.
Sketch	Sketch a diagram of the muscles in the human hand.
Interview	Interview your team mate on the following topic (indicate topic).
Record	
Simulate	Simulate the behavior of a _____.
Classify	Classify these fossils into groups based on skelatal type.
Analyze	Analyze ~~the solution~~ Analysis in the test to be and determine its chemical composition.
Classify	Classify the samples of soil, using a ph test, into acid, alkaline and neutral soils.
Discuss	What was the author's purpose, bias, or prejudice?

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Verbs	Example Questions/Objectives
Divide	
Explain	What must you know for that to be true?
Infer	Infer which of the components is mal-functioning given the following input (give input).
Inspect	Inspect the food processing facility and prescribe the vermin eradication measures necessary.
Separate	Separate the main from the subsidary characters in the book.
Sort	Sort these vegetables according to _____.
Differentiate	Which are facts and which are opinions?
Experiment	
Compare	Compare (list similarities and differences) the two characters in _____.
Contrast	Contrast (list differences) the two methods.
Scrutinize	
Probe	
Investigate	Investigate the relationship between plant growth and fertilizer application.
Discover	Discover what is missing in this diagram.
Inquire	
Detect	Can you detect the power shift using a _____ on this piece of equipment.
Examine	Examine this specimen and classify it based on its attributes.
Survey	
Dissect	Dissect the frog and illustrate what you find.
Simplify	Simplify this mathematical statement.
Search	
Survey	
Deduce	
Breakdown	Breakdown the solution into it component parts using a centrifuge.
Advertise	
Categorize	Categorize the stories into fiction, biography, etc.
Catalogue	
Correlate	
Diagnose	Diagnose the fault in _____.
Divide	Divide this expression into its component parts.
Isolate	Isolate the critical incident in the chapter which changed the way the character viewed world.

Verbs	Example Questions/Objectives
Measure	Measure the impact of the statement on your classmates. Are the author's conclusions substantiated by evidence? How did Indian families, in Oklahoma, circa 1840, divide the daily work? Which of the statements in the proof are not properly supported? What is the theme that recurs throughout this musical arrangement? Study the diagram and given information. What information is fact and what must be proved? Which section of the orchestra essentially carried the theme in the last piece? What have we assumed to be true if we accept these conclusions? What generalization is the author making about the people of Western Europe? Which of the statements in the report are irrelevant to the author's conclusions? Which of the propoganda techniques given by the author apply to this advertisement? How is the judge's sentence related to the defendent's wrong-doing? From our discussion of human behavior, what are two basic assumptions we must accept regarding people? Does the data support the hypothesis that women are not treated equally? What do you think was the artist's reason for painting this picture? "Some people are more equal than others." Describe the process by which the individual who voiced this phrase arrived at his conclusion.
Arrange(new way)	Arrange the components into a new model.
Combine	Combine these two ideas into a metaphor.
Construct	Construct a model which illustrates the way in which the process works.
Create	Create a story which illustrates your viewpoint or the subject.
Design	Design the alternative method to _____.
Develop	Develop an alternative way to doing _____.
Generalize	Generalize this concept (provide concept) to other situations.
Organize	Organize these ideas into a meaningful structure.
Plan	Present a plan to do _____.
Predict	Predict the outcome(s) based on the information which has been developed in _____.

Prepare	Prepare a new approach to _____.
Compose	Compose a (music, art, etc.) piece.
Propose	Propose a new method by which _____.
Produce	Produce a product.
Invent	Invent something which will _____.
Formulate	Formulate a new procedure which will _____.
Assemble (new way)	Assemble the data, in a new way.
Build	Build a model which represents _____.
Set up	
Originate	What would you do if _____?
Contrive	
Concoct	
Systematize	Systematize the information according to your own internal representatives of _____.
Blend	
Reorganize	Reorganize the information to support your viewpoint or argument.
Make	Make a _____ to _____.
Generate	Generate a (poem, product, etc.) using the _____.
Evolve	
Constitute	
Breed	
Compile	Compile a review of the literature on _____.
Make up	
Form	
Imagine	If no one else knew, how could you find out?
Extrapolate	
Hypothize	

What recommentations would you make to improve the air pollution problem in large cities?

What would an Indian family (Oklahoma, circa 1840) need to do to move?

How would you plan to teach a unit on geometric construction?

What would the world be like if we had no no unique mathematical operations?

What would be the most important questions to ask in determining a solution to this problem?

How could the story have ended differently?

How many different uses of the coat hanger, other than hanging clothes, can you name?

Can you devise a set of rules for the first group of settlers on the moon?

Based on our study of the development of the African counties, what predictions can you make about the political future of Tanzania?

How might the days or seasons differ if the earth was in the shape of a pyramid with a square base? Assume that the earth revolves on its own axis and rotates around the sun.

How can you best communicate your feelings about freedom?

How can we get community support for a peer drug counseling program?

From our experiments with plants and different types of soil, what statement can we formulate regarding plant growth?

Drawing on your experiences in school, how do people view education in this country?

Evaluation

Verbs	Example Questions/Objectives
Appraise	Appraise the value of _____.
Assess	Assess the viability of _____.
Critique	Critique the article, based on the teacher checklist.
Estimate	Estimate the results of taking the course of action.
Evaluate	Evaluate the merits of _____.
Grade	Grade the level of quality of _____.
Judge	Judge, based on internal criteria, the worth of _____.
Rank	Rank the merits of _____.
Recommend	
Test	Test, using the experimental method, the hypothesis of _____.
Decide	Which of the books would you consider of greatest value?
Compare	
Revise	
Conclude	Conclude whether or not the hypothesis should be rejected.
Select	Select the best _____ based on internal/external criteria.
Criticize	
Measure	Which policy will result in the greatest good for the greatest number?
Prioritize	
Weight	
Accept	For what reason would you favor _____?
Reject	
Determine	Determine the merits of the arguments.
Referee	
Umpire	
Arbitrate	
Decree	
Rule on	
Award	

Verbs	Example Questions/Objectives
Censure Settle Edit Adjudge Debate Editorialize	Based on the criteria of effectiveness and and economy of time, effort, and money, what would be the best solution to the middle east conflict? What are the good and bad aspects of being a member of a normadic group?
	Was Rene Descartes a better philosopher than a mathematician? Is the construction of this geometric figure an accurate representation of the given information? Which of the three pictures has the best color combination? What conclusion can be justified in the selection read? Is this the most appropriate art form to depict the subject? What best justifies the action taken by the countries presently being studied? Was this event accurately reported by the correspondent? Indicate in what ways this is a beautiful poem? According to the stated situation, which is the most appropriate move that man could take? What do you think could happen if the Berlin Wall were torn down and the barriers were removed?

Appendix 2
Products

The following are illustrative of products which the students can be asked to develop. You should try always to have students develop some product as the result of doing a Bloom's objective.

1. a letter
2. a lesson
3. advertisement
4. annotated bibliography
5. art gallery
6. block picture story
7. collage
8. collection
9. collection w/illustration
10. chart
11. choral reading
12. comic strip
13. cooked concoction
14. crosscut diagram
15. crossword puzzle
16. debate
17. demonstration
18. detailed illustration
19. diorama
20. display
21. editorial
22. essay
23. experiment
24. fact file
25. fairy tale
26. family tree
27. filmstrip
28. flip book
29. game
30. glossary
31. graph
32. hidden picture
33. illustrated story
34. jigsaw puzzle
35. labeled diagram
36. large scale drawing
37. learning center
38. letter to the editor
39. map
40. map w/legend
41. mini-center
42. mobile
43. mural
44. museum exhibit
45. model
46. oral report
47. pamphlet
48. photo essay
49. pictures
50. pictures dictionary
51. picture story for children
52. poem
53. porta-center
54. poster
55. project cube
56. puppet
57. puppet show
58. rebus story
59. riddles
60. scavenger hunt
61. science fiction story
62. scrap
63. sculpture (clay, wire, junk)
64. seek and find
65. skit
66. small scale drawing
67. song
68. songs (collection)
69. stencil
70. story
71. street map
72. survey
73. tape
74. terrarium
75. text book
76. time line
77. transparency for an overhead projector
78. travelogue
79. TV news report
80. video tape
81. vocabulary list
82. worksheet
83. written report

Appendix-3
Units Without Content

These units were developed by Pat Jaynes (1982) as part of an introductory course in gifted education at Oklahoma State University.

Wild Birds in Our Area

Knowledge: Make a list of birds you already know. Study the field guides so you know how to use them. Use the maps to identify birds of this region and familiarize yourself with species you will find here.

Comprehension: Explain the maps. Discuss the localities different species live in.

Application: Take several field trips with an experienced birder or with a local Audubon Society member or group. Identify as many as you can. Keep a list of those you see and be able to describe the habitat group (lakes, ponds, city parks, salt marshes, etc.)

Analysis: Write an article for the school paper or the local Audubon Society's newsletter telling about your field trip.

Synthesis: Develop a plan for making an area attractive to birds. Make a bird house for a specific species (bluebird, martin, wood duck, wren). Put it up in the most appropriate, inviting place. Do planting for wild birds. Set-up a feeding station.

Evaluation: Decide whether or not persons in the local community should increase their efforts to attract and feed birds.

Current Humor in the U.S.A.

Knowledge: Make a list of political issues (gun control, taxation, defense spending are examples) and current values (marriage, ERA, child-rearing, working women, changing sex roles, TV are examples.)

Comprehension: Discuss in a written paper or a poster the pros and cons of five issues or values you have chosen (3 of each). Present both sides of the controversial topic.

Application: Collect cartoons, political cartoons from the editorial pages of newspapers or comic strips. Arrange them to illustrate the topics you have chosen. Make them into a cartoon book or make transparencies to share with others.

Analysis: Tell what you've found about the techniques the cartoonists use (sarcasm, irony, caricature, etc.). You might have to do additional research on elements of humor. Discuss in writing, or on tape, what you think makes certain cartoons funny to you, to others.

Synthesis: Do a series of cartoons of your own to illustrate two chosen topics. Make some that illustrate both sides of the argument. Submit your favorites to your school newspaper or your local paper.

Evaluation: Make a list of criteria for judging cartoons. Judge the ones you have. Support or dispute the stand taken by the cartoonist.

Appendix 4
Units with Content: Corals and The Swamp Rabbit

Knowledge and Comprehension Questions
Exploring Australia's Coral Jungle
Work Sheet
(Developed by Kay S. Bull, 1984)

Suggested Readings: MacLeish, K. Exploring Australia's Coral Jungle, National Geographic, 1973, 143(6), 743-778.

Taylor, V. & Taylor, R. Australia's Great Barrier Reef, National Geographic, 1973, 143(6), 728-742.

1. What is a Bommie? _____

2. Define the following:
   a. Gorgoneion _____
   _____
   b. Mollusk _____
   _____
   c. Aquarists _____
   _____
   d. Hydroids _____

3. Identify the greatest geographic feature on the earth build by an animal.
   _____

4. Why does the reef system end in the south at Lady Elliot Island? _____
   _____

5. List five habitat requirements of coral. _____
   _____

6. List the dangerous poisonous animals that are in the article. _____
   _____
   _____

7. List 5 night feeders which live in the coral reef. _____
   _____

8. Why is the crown of thorns starfish called a spiked scourge? _____
   _____

9. What is the difference between a soft coral and a regular coral? _____
   _____

10. Explain why you could not make a 1:1000 scale model of the Great Barrier Reef. _____
    _____

Exploring Australia's Coral Jungle
Answer Sheet

1. A coral head

2. a. Representing the head of a gorgon, especially medusa; something that looks like this.
   b. in invertebrate in a shell which at least partially encloses a soft unsegmented body with gills, mantle and foot.
   c. People who keep aquaria or fish tanks
   d. that form of hydrozian which is asexual and grows into branching colonies by budding.

3. he Great Barrier Reef

4. water temperature drops below 68 degrees F.

5. 68 degrees farenheit water, light, salinity, nutrient and oxygen content.

6. sea snake, stone fish, scorpion fish, cone shell, sea anemones, box kellyfish.

7. stingrays, mollusks, crabs, starfish, coral

8. it eats coral

9. the soft coral does not have a limestone extoskeleton

10. because at this scale the model would cover 800 square miles.

Exploring Australia's Coral
Higher Level Questions

(AN) What was the attitude of the author toward collectors of specimens? What makes you think so? Cite specific examples.

(AP) Make a chart showing the different shapes of coral. (Provide at least 10 examples.)

(E) Why would cleaner wrasse be able to change from female to male? Make a speech about the biological necessity of this behavior.

(S) Imagine that you were a crown of thorns starfish. You have been asked to defend your kind in a public forum, a nationally televised panel show, where newsmen will question you. To prepare for this you need to have practice dealing with possible questions. Prepare your briefing book.

(AN) Compare man to fish in terms of locomotion, habitat, diet, etc.

(AN) Why did the Great Barrier Reef develop? Where did it? Develop a slide show or film strip to support your analysis.

(AP) Construct a model of a coral reef.

(E) Julie Booth lived by herself on the coral reef. Examine the pro's and con's of such an existance. Write a propogandistic speech which is designed to either have people live by themselves or vice versa.

(S) Imagine that you were a 3 inch high aquaperson who lived on a coral reef. Describe your life in a poem.

(S) Look at the various kinds of coral. Draw a montage of the various corals to show how you feel when you are happy.

Swamp Rabbit

Reference: The Swamp Rabbit, by James McCain, Oklahoma Outdoors, 1957
(Developed by Kay S. Bull, 1984)

1. What has reduced the range of the swamp rabbit? _____

_____

2. Describe how a box trap works. _____

_____

3. Define the following:
   a. Leached _____

   _____

   b. Splayed _____

   _____

   c. Sedge _____

   _____

   d. Bramble _____

   _____

4. How would male swamp rabbits mark off their territory? _____

_____

5. Why would a swamp rabbit build its nest on the high ground? _____

_____

6. How large does a swamp rabbit grow to be? _____

_____

7. How do biologists make population counts of swamp rabbits? _____

_____

8. How can you tell the difference between the track of the swamp rabbit and the track of a cottontail? _____

_____

9. How long is it, approximately, from the time a swamp rabbit is born until it is on its own? _____

_____

10. Why is the swamp rabbit formally named sylvilagus aquaticus? _____

_____

Swamp Rabbit
Answer Sheet

1. Dams, agriculture, the Bulldozer, man

2. Rabbit enters the box, pulls at the bait and the door shuts.

3. a. To have soluble constituents removed by percolation
   b. To spread out, expanded or extended.
   c. Any of various rushlike or grasslike plants consisting of the cyperaceous genus.
   d. Any rough prickly shrub, as the dog rose.

4. Beating the ground with their hind feet, thus creating a rapid humming noise.

5. To keep it from being flooded.

6. Six pounds

7. Look for and count number of droppings.

8. The swamp rabbit track will be larger with slightly splayed toes and large toenails.

9. About 50 days.

10. Genus-sylvilagus; species - aquaticus or water

Swamp Rabbit
Higher Level Questions

(AP) Draw a map of the swamp rabbit habitat in Oklahoma, during the 1930's.

(S) Describe being harvested with a green stick as if you were a swamp rabbit. Write a song about it.

(AP) Build a box trap capable of trapping a six pound swamp rabbit.

(S) Write a play about swamp rabbits. You may use Watership Down as a model if desired.

(A) Analyse topographical and topological maps of your area. On a country map indicate the most likely swamp rabbit habitat.

(A) Draw a set of pictures showing the differences between swamp rabbits and cottontails. Create a display of pictures and text which could be used for an informative poster session.

(E) Evaluate the remaining range of the Oklahoma swamp rabbit. Project, based on current economic predictions, the range of the swamp rabbit in 2025 A.D.

The

RABBIT

Sacrifice to Progress

BY JAMES McCAIN
WILDLIFE BIOLOGIST
PHOTOS BY CLIFF KING

SWAMP RABBITS once occupied a range in Oklahoma that reached from the fertile valleys along the Washita River in the west to the Arkansas state boundary in the east.

Erratic routes that free - flowing rivers took across the state created vast acres of prime swamp rabbit range. The behavior of these rivers could not be tolerated by some men. Means of taming them began.

In this modern civilization, man's capacity for making rapid changes in the environment is evident everywhere. Construction of dams make mild, slow-moving streams out of once free-running rivers. Fertile soils that had built up in overflow areas were reclaimed for agriculture, thus bringing about extensive changes in land use that took its toll of wildlife . . . especially swamp rabbits.

Here was an animal that could cope with its unrelenting natural predators and the seasonal pressure of beagles and hunters. Still, it was no match for the bulldozer. Bramble patches, sedge fields and cane breaks gave way to soybean fields and improved pastures.

This story involves a species of wildlife that is directly in the path of progress. Man's constant desire to change has started the extinction process that undoubtedly will spell the demise of one of the finest game animals ever to perplex a hunter in Oklahoma.

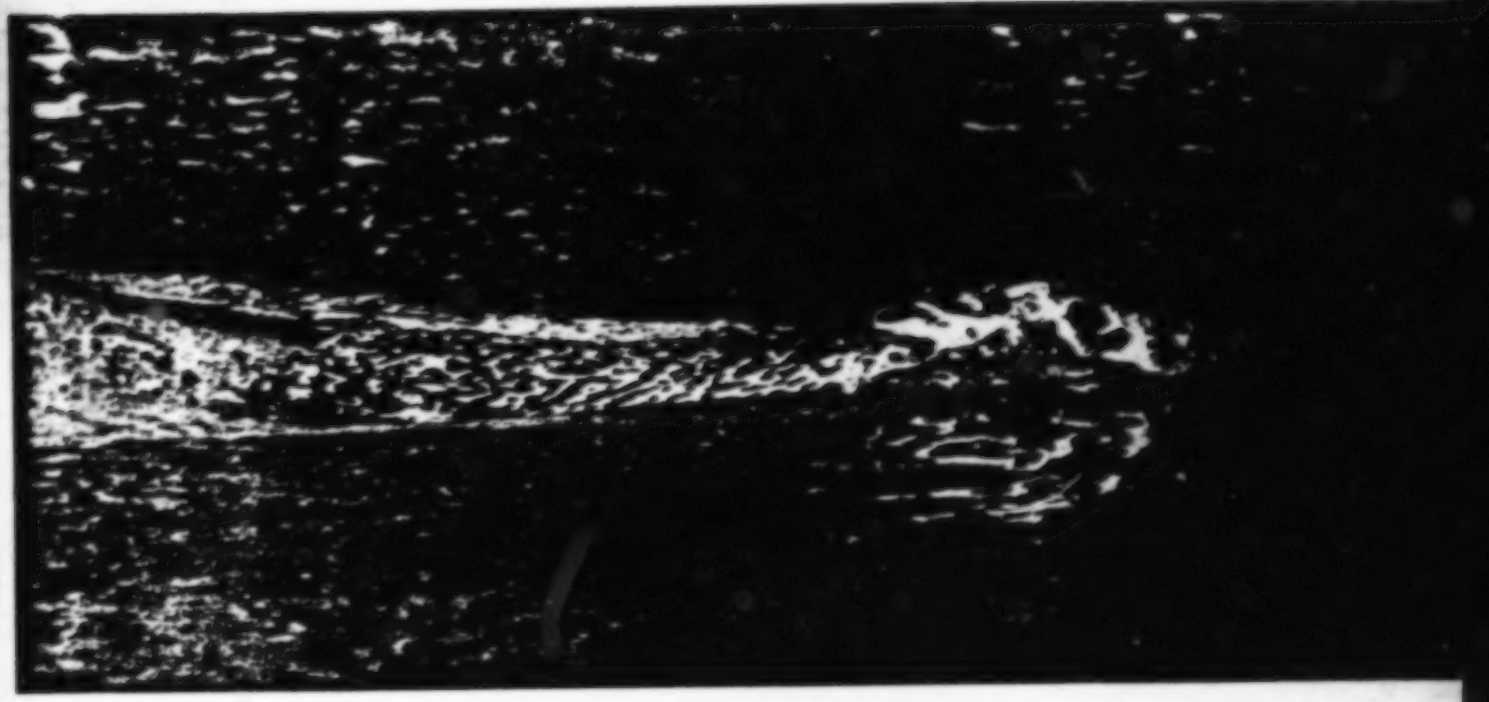
Back when the depression of the 1930's hovered over the state, the then-plentiful swamper played an important role. Pursuit of this rabbit by hunters became an enjoyable and inexpensive pastime. There were several methods of capture employed back then.

One involved the use of a fast "cur" dog and a forked green stick. The fast dog, most often a silent trailer, surprised the rabbit and forced him to seek the safety of the nearest burrow. Once located, the rabbit could be pulled out by means of the forked stick twisted in his fur.

Sometimes the swamp rabbit took refuge in a hollow log, and the more zealous (or famished) of his human pursuers would use a cross-cut saw to sufficiently shorten his wooden refuge. A green hickory stick made a good probe to locate the rabbit so the hunter didn't saw him in half

A young swamp rabbit emerges from his nest to start a perilous journey through life. His kind can successfully cope with hunting pressure and predators, but not with the habitat-destroying drainage ditch and bulldozer.

SWAMP RABBIT



or cut the deadwood too far away from him.

The method that probably resulted in the harvest of more swamp rabbits than any other during the lean years was a simply constructed box trap. Baited with a food attractive to the swamper, the box trap was often placed in rabbit runs and feeding areas during the winter.

At one time, Oklahoma provided a wide variety of swamp rabbit range across its forested landscape. The range extended from the cottonwood-dominated Washita River bottoms south and eastward to the giant cypress swamps along the Mountain Fork.

The Kiamichi Mountain area in the southeast provided only limited range for the swamper, even back during the animal's prosperous years. The bottomland soils were leached, poorly drained and relatively infertile. These lands were cleared and cultivated for a short period of time, then allowed to return to hardwood cover.

A large wooded section of rolling uplands extending from the Kansas state line to Texas produced prime swamper habitat along its streams. Fertile soils created havens for this animal on the north side of the winding river valleys.

A smaller range occurred in south-central Oklahoma where irregular areas of lowland hardwood afforded swamp rabbit environment. A low population of these rabbits still occupies the southern part of this range.

A network of rivers that drained the northeast created another fine area for swampers. Most of the run-off moved to the Arkansas River where wide valleys of hardwoods became the predominant vegetation. Early inhabitants found ready uses for this excellent timber, and the resulting cut-over lands further proliferated the rabbit.

The last stronghold of the swamper in Oklahoma was the coastal plain drained by the Red River. An abundance of marsh type plants were produced by the heavy clay soils, mild climate and annual rainfall of approximately 55 inches.

The swamper's range in central Oklahoma was limited to the narrow woody streams that carried rainfall from the prairie.

In his element, the swamp rabbit is like all of Nature's creatures . . . a unique wonder to behold. He has his own peculiarities and standards, not the least of which is the territorial and courtship behavior.

In Spring, when the length of day increases, strange lyrics begin to ride the sound waves in swamper country. Males usually announce their ownership of territory by besting the ground with their hind feet, thus creating a rapid thumping noise.

The same stimulus that prods the male lures the female to new activities. She will join the male in making feinting dashes, high jumping and "facing off", all the while emitting a high-pitched squeaking noise.

This activity may start as early as January, although the reproduction pattern of swamp rabbits in Oklahoma does not generally conform to patterns studied in more northern ranges. In some populations in our state, reproduction has occurred throughout the year.

Completely at home in the water, the versatile swamper often uses this medium to elude his pursuers

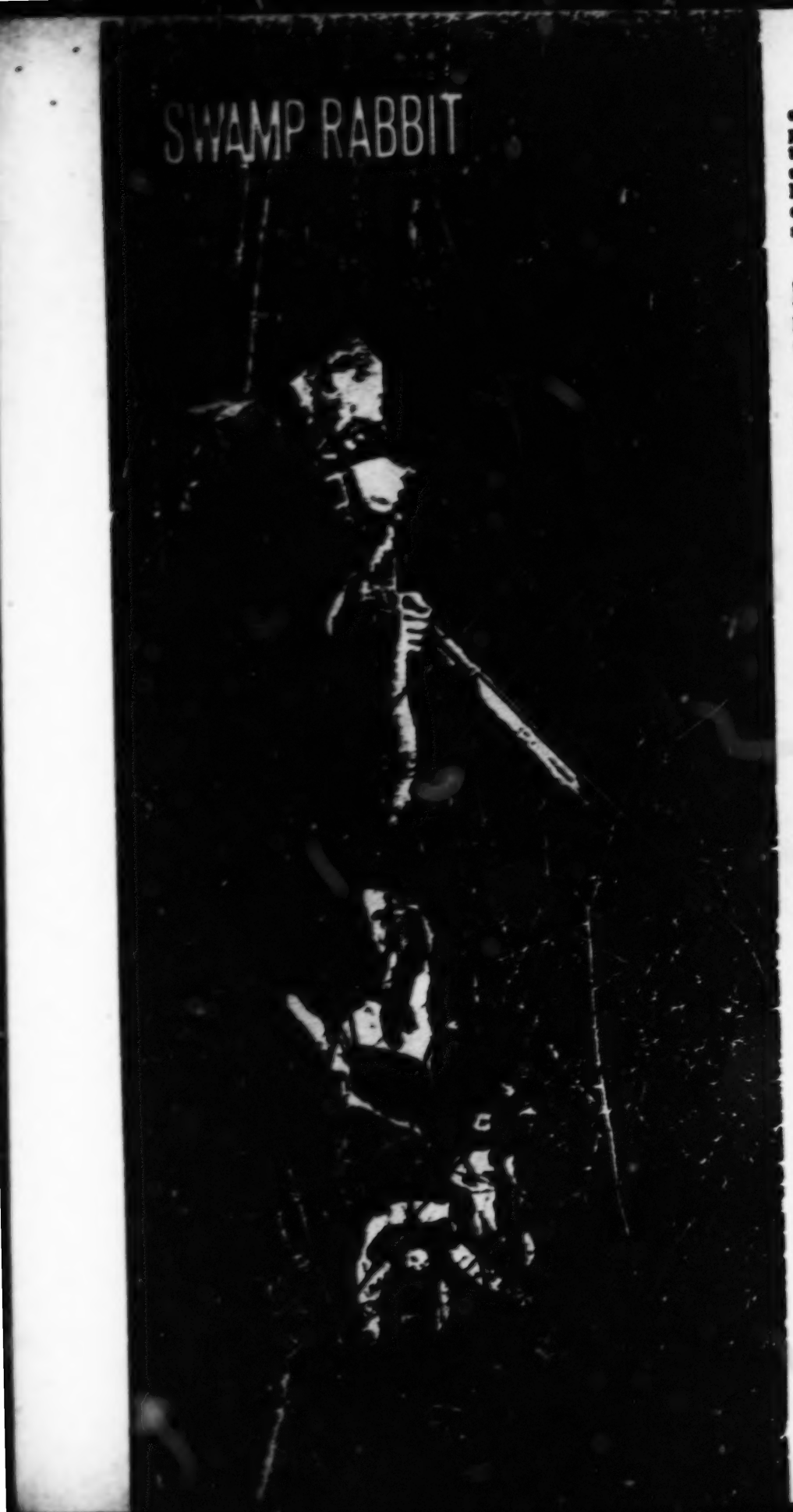
One of several dozen swamp rabbits netted from the dammed-up Mountain Fork River late in February, 1969. The author used the rabbits in his study of habits and environmental requirements

This does not guarantee a good population, however. When a rapid, violent change in habitat occurs, the swamper population is thrown into a prolonged stressed condition, and entire litters may be lost before they are even born.

Most studies on this mammal have revealed very few nests, but those discovered have had similar locations. Nests are constructed on railroad fills, stump mounds and naturally elevated ground. Sites probably are selected to avoid flood waters that frequently invaded the range.

The nest is usually a mound of vegetation built above ground and approximately 12 to 15 inches long. There is often a slight depression in the middle. Nest material consists of surrounding vegetation, commonly broomsedge, and the depression is lined with fur pulled from the rabbit's throat and stomach.

It is too bad that the swamper requires a habitat associated with untamed rivers, areas where the stream channel shifts and large pools of shallow water are left after each heavy rain.



As farming and ranching developed into an intensified agricultural practice, demand became heavy for the marginal lands along the capricious rivers and creeks. It is in these lands and their borders that much of our upland game, not just the swamp rabbit, is produced.

When marginal land is brought into domestic crop production, the land values and tax structures seldom allow the area to revert back to its original state.

One of these agricultural practices now being applied to our decreasing swamper range is the construction of drainage ditches. These get rid of trapped surface waters that do not drain well through the heavy clays. Once the water is controlled, timbered areas are cleared and tame pastures take over.

Out of these and other endeavors to modify the natural drainage in this country for man's food and population needs, we are surely losing one of our most unique upland game species. The swamper is the sacrifice in his own particular area.

He will most certainly be missed . . . by the grizzled hounds that he led in merry circles through the scent-covering shallows . . . by the young fellow with his first shotgun who stares in disbelief at the "giant cottontail" swimming across a channel with all the skill of a raccoon or mink.

We still have a few isolated pockets of swamp rabbits in Oklahoma, and anyone who follows the beagles is doing himself an injustice by not trying for them, just once. Hunting pressure isn't going to hurt the swamper. It's the bulldozer, drainage ditch and dam that will eventually exterminate the species.

When one becomes closely associated with a creature of interest over an extended period of time, its destiny has a great significance. The route which the swamp rabbit has been forced to take disturbs our wildlife biologists.

The encroachment of modern agricultural practices on the habitat has reached a dangerous plateau. The swamper's existence hangs in the balance.

The alarm has been sounded, but will the echo be heard?

WILDLIFE PORTRAIT

THE SWAMP RABBIT

OUR MOST FAMILIAR RABBIT, The cottontail, has a close relative we don't know quite as much about. It's the swamp rabbit (Sylvilagus aquaticus), a rodent that inhabits lowland swamps and riverbottoms from east Texas and southern Oklahoma to Georgia. In Oklahoma, swamp rabbits are most likely to be found in southeast McCurtain County and swampy areas along the Arkansas River.

The swamp rabbit is not too difficult to distinguish from the cottontail if you give it a second look. It's larger (up to six pounds), has larger ears and darker, shorter fur. The tail is white underneath, but it is slender and very different from the round puff of white that gives the cottontail its name.

Another major difference between the two species is habitat preference. Don't look for the swamper in shrubby second growth, old fields or suburban backyards, the favorite haunts of our upland-oriented cottontail. The swamp rabbit is more likely to be found in mature woods, especially in swampy areas where patches of water are interspersed with ridges of higher ground. However, cottontails may be found in such areas as well.

One good way to tell if you are in swamp rabbit territory is to look for the droppings they characteristically leave on top of stumps, logs or other elevated spots. This habit is so predictable with swampers that some biologists have used the number of such sites in an area to help make population estimates. Studies indicate one individual may use several specific stumps, logs, or other elevated sites regularly.

THE TRACK OF THE SWAMPER is large, and the imprint of the slightly splayed toes and large toenails are distinctive. Also, the swamp rabbit often chooses to walk rather than hop. This is almost unique among rabbits and leaves an unmistakable trail, especially notable in mud or snow.

Like all rabbits, the swamper is a vegetarian. It eats herbaceous plants, especially sedge grasses, but less grass than the cottontail. In winter the diet consists primarily of bark, twigs and the seedlings or roots of perennial herbs.

Swamp rabbits are not often found far from water, a certain indication of how their common name was derived. They are willing swimmers. Water is a favorite refuge from pursuing enemies, and may also be used to dampen the effects of the oppressive summer heat.

The swamp rabbit may use a stream for backtracking, or it may try to escape a pursuing dog by diving. Sometimes a harried swamper is discovered hiding under an overhanging bank, submerged except for eyes and nose. This bunny seems to have no aversion to getting wet, even in the coldest weather. A casual swim to a small island merely for a look around is not unusual, though it may bring a "double-take" from any person seeing it.

Swamp rabbits are much like cottontails in their behavior, except that they are more vocal. Five different calls can be heard. Either sex may "squeak" at the other. A female who is being followed persistently by a romantic male may "chirp" softly.

The "alert call" is a loud, throaty, two-syllable sound which gets the attention of every other rabbit in the vicinity. The rabbit giving it stands on his hind legs, and all rabbits hearing it pass it along in the same manner. A loud "scream" is reserved for times of utmost distress, such as when the rabbit has been grabbed by a predator. This is a sound most often reproduced by commercial predator calls for attracting foxes, bobcats and coyotes.

MATING IS PRECEDED by lively courtship behavior involving mad dashes and dispersal of scent, accompanied by assorted leaps by both doe and buck. Fights between bucks occur at this time, but usually results in little more than the loss of some fur.

Mating activity is highest in February and March, though it may continue until September. Some of the rabbits that breed late may be young does born early the same season. The young are born about 40 days after mating, usually two to four in a litter and already covered with hair. In two or three days, their eyes open and the young rabbits start taking their first, tentative steps. They will remain in the area of the nest for a few more days, then will disperse to feed on their own.

A swamp rabbit nest is usually built on the ground. It may be concealed by thick weeds or the edge of a brushpile or may be hidden under a fallen branch or log. It is not elaborate . . . maybe only a few weeds pulled around the edge of a slight depression . . . but it is made comfortable with a soft lining of fur pulled from the mother's belly.

The female spends two or three days building her nest. During this time, males start courting her again. After about forty-five minutes in the nest giving birth, she may mate again immediately and, if this is the case, will probably have another litter in early summer. ■